

and one-half times the length of the insect. *Legs* rather pale, tibiae and tarsi infuscate, rather densely set with silvery hairs. *Wings* beautifully iridescent and rather sparsely set with long gray pubescence, fringed all the way around; costal and first longitudinal nervures rather heavy and united at the apex of the wing as one continuous vein. The little cross vein between the first and second transverse nervures and the outer or upper branch of the fork in the third transverse nervure are almost obsolete and scarcely visible except in favorable light. Length of dry specimens one and one-half mm. Length of fresh specimens two mm.

The eggs (E) are a bright orange color, .4 mm. in length and much elongate. Some are straight, others are variously bent and all are pointed at one end and often with a short pedicel attached.

This insect is decidedly an injurious species. Trees upon the College campus that were the most severely attacked

by this fly the past summer have had not more than half of their normal amount of foliage this year.

On the 18th of April, last, the writer noticed the flies abundant among the branches of the trees and the process of egg-laying was carefully watched with a hand lens. The females were so intent in their duties for the propagation of the species that they were not easily disturbed. They do not pierce the bud scales but work their long slender ovipositors far down between the scales and there deposit a large nest of eggs, sometimes forty or more in a place. By separating the scales the clusters of eggs can be plainly seen with the naked eye. The irritation set up by these eggs and the maggots that hatch from them aided, perhaps, by a poisonous secretion from the mother insect causes the abnormal development of the part. The galls all die a few weeks later when the maggots leave them. These dead galls turn black and remain upon the trees giving them an unsightly appearance.

PREPARATORY STAGES OF CERURA MULTISCRIPTA, RILEY.

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Egg. Slightly more than hemispherical, the base flat, dead sordid white, covered with many short dark brown hairs irregularly laid on and distributed also on the parts of the leaf adjoining. Diameter 1.3 mm. Laid in groups of five or less on the under surface of a

leaf. These eggs had hatched when found, the larva having emerged from a hole in the side, leaving the rest of the shell intact.

First stage. Head subquadrate, depressed at the vertex, black and shining. Width, .6 mm. Body furnished with

minute tubercles, a spined process at each side of the cervical shield and two tail-like appendages which take the place of the anal feet. Color black throughout a little paler ventrally.

Second stage. Head rounded, minutely punctured, with a tubercle below the vertex of each lobe. Color purplish black, a little paler about the sutures of the clypeus (triangular plate). A few short hairs. Width .9 mm. The body has several rows of minute piliferous tubercles, two large, thick, heavily spinose cervicle horns on joint 2; tails, long, sharply spinose, shiny black, the extensile threads purple black, whitish at base. Body velvety purple black, the venter greenish. Length of body 4 mm., of tails 4 mm.

Third stage. Head with two tubercles before the apex of each lobe, one in the centre of and one each side of the clypeus. Color, dull black, clypeus and mouth reddish, ocelli black, antennae pale. Width 1.3 mm. Cervical horns thick, heavily spinose, the spines blunt and each tipped with a hair. About six rows of elongated piliferous tubercles on each side, alternating anteriorly and posteriorly on each segment. Tails long, heavily spinose, black, the extensile threads brown, white at base. Body and legs greenish yellow, a black dorsal band covering the cervical horns, narrowing to joint 4 where the dorsum is angularly elevated, widening to near the spiracles on joints 8 and 9, then continuing evenly over the subdorsal space to the last segment. Spiracles narrowly black ringed. Length of tails, 5 mm.

Fourth stage. Head dead purple black, greenish at the sides posteriorly, the upper half sprinkled with little yellowish dots, but leaving a line of the ground color each side of the central suture.

Clypeus and mouth, paler and shiny; antennae whitish, ocelli black. Width 2.1 mm. Body as before, considerably elevated dorsally at joint 4 with a rounded pinkish dorsal process. Cervical shield large, purplish black, the horns rather thick and short, heavily tuberculated. Body yellow-green, the dorsal stripe black as before, but a little purplish, spiracles white with a fine black border, the posterior ones more or less surrounded by black. Tails heavily spinose, black; length 7 mm. The piliferous tubercles of the body are very small, those on the lateral region white besides many small lateral white spots. A narrow yellowish stigmatal line. Two erect spiny black hairs beyond the anus.

As the stage advances, the spines on joint 2 become partly white, the dorsal band partly striated and indistinctly bordered anteriorly with white, the stigmatal line just below the spiracles is white and there is a general approach to the next stage.

Fifth stage. Head rounded, rather flat in front, shagreened. Color black, green at the sides posteriorly, a large band in front as wide as the space between the eyes at base, but narrowing to the vertex, sordid white, mottled a little with the ground color. Labrum whitish; maxillae black; antennae

white. Width of head 3.7 mm. Cervical shield large, angulated at the corners without any horns or spines. Beneath it the head can be partly retracted. Body angularly elevated at joint 4 with a dorsal fleshy process. Tails 9 mm. long, whitish above and green below at the base, the rest purple with black spines. Extensile threads yellowish at base, then red fading to yellowish again towards the ends. Body green, a broad white dorsal band edged with white, confusedly striated on a purple ground which soon becomes green, a little purple on joints 2-4, decidedly so on the anterior corners of the cervical shield (where it shades into pinkish in the fold of skin behind the head) on the hump on joint 4 and on joint 8 subdorsally in the angle of the band. It begins broadly on joint 2 covering the cervical shield, narrows to the process on joint 4, widens to just above the spiracles on joint 8 and gradually narrows to joint 13, where the anal plate is greenish. A distinct white substigmatal line, edged below with brown and narrowly above with black, absent on joint 2 and turned up at its anterior end. Many small lateral white flecks. Spiracles, black, white centrally. Thoracic feet twice lined with black longitudinally; abdominal, once transversely, the claspers tipped with black. Length 25 mm. exclusive of the tails. The erect spines beyond

the anus, whitish. When the larva has finished eating, all the white of the dorsal band except its borders fades out, leaving the back green and the cervical shield pale blue.

Cocoon. Formed on wood of gummy silk strengthened by many little pieces of bark and wood bitten off from the inside, thus forming a hollow. It is elliptical, just large enough to contain the larva and becomes very hard, closely resembling a lump or excrescence on the bark.

Pupa. Cylindrical, tapering a little towards both ends, the last two abdominal segments rounded and appressed, the others capable of motion; no cremaster. Eyes prominent; a narrow carinated ridge runs along the head from between the eyes to the back of the place of origin of the antennae. Cases creased and very minutely punctured, not shiny; eyes and body sublustrous, the latter minutely granulated at the anterior half of each abdominal segment; spiracles distinct. Color dark reddish brown, with a blackish shade over the dorsum. Length 18 mm., greatest width 6.5 mm. Pupation occurs in about two weeks after the completion of the cocoon and the insects remain in this stage throughout the winter.

Food plants. Willow (*Salix*), Poplar (*Populus*). Larvae from Dutchess Co., N. Y.